PROPOSED

Environmental Assessment

for the



HAVASU NATIONAL WILDLIFE REFUGE

Feral Hog Management Plan

DEPARTMENT OF THE INTERIOR U.S. FISH AND WILDLIFE SERVICE

ENVIRONMENTAL ASSESSMENT

Feral Hog Management Plan

Havasu National Wildlife Refuge U.S. Fish and Wildlife Service Department of the Interior

Authority for Action:

NATIONAL WILDLIFE REFUGE ADMINISTRATION ACT OF 1966

NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

ENDANGERED SPECIES ACT OF 1973

NATIONAL WILDLIFE REFUGE IMPROVEMENT ACT OF 1997

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October 2002

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Havasu National Wildlife Refuge U.S. Fish and Wildlife Service Department of the Interior

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

The feral hogs pre feral hogs presently The feral hogs presently found in the U.S. descend from two releveleased, released, abandoned, or escaped, and wild stock (Russian boar) introduced for hunting purpose (Bratton). (Bratton). Although feral hogs look similar to domestic swine, they q(Bratton). Although feral characteristics of wild swine that include: elongation of the characteristics of wild swine that include: curlcurl in the tail, four continually growing tusks found on bocurl in the tail, four continually growing tusks found on bocurl in the tail, four continually growing tusks found on bocurl in the tail, four continually growing tusks found on bocurl in the tail, four continually growing tusks for toughtough skin composed of cartilage and scar tissue (3 feet in length and 300-400 pounds in weight.

FeralFeral hogs are the most prolific large mammal inFeral hogs are the most prolific large mammal in North Am doubledouble their population in four months (Barrett andouble their breedingbreeding at six months of agebreeding at six months of age and have an average of two litters (USDA). Here at Havasu(USDA). Here at Havasu National Wildlife Refuge (NWR), the feral(USDA). Here at long, as sows with their piglets are observed year round.

FeralFeral hogs Feral hogs have Feral hogs have demonstrated that they can adapt to just about any habitat type an havehave established populations in 23 states across the U.S. (Miller 1993, Gipson et. al 1997). seemseem seem to prefer meem to prefer moist bottomland and are common along riparian areas with detection (Stevens 1996). Feral hogs at the Topock Marsh Unit of Havasu NWR are commo (Stevens 1996). Fedeling feeding in the emergent vegetation surrounding the marsh and traversing along feeding in the emergent network of trails.

FeralFeral hogs Feral hogs are considered to Feral hogs are considered to be opportunistic omnivores (Stevens 199 vegetativevegetative matter, portions of birds, eggs, small mammals, fawns, piglets, frogs, snakes, lizards, salamanders, salamanders, turtles, salamanders, turtles, and insects have all been found in feral hog stomachs along vofof invertebrates (Wood and Barrett 1979). With their keen sense of sn toto be formidable predators. Calves, to be formidable predators. Calves, kids, to be formidable predators. Calves toto become prey of feral hogs (Stevens 1996). Although the feralto become prey of feral hogs (Stevens 1996 diversediverse diet, the season or time of year determines the main staples ofdiverse Refuge include grasses, forbes, rootsRefuge include grasses, forbes, roots and tubers. During the late summer / mesqmesquitemesquite beans. Thmesquite beans. The diet of feral hogs has been documented to directly compedeer, deer, turkey, deer, turkey, waterfdeer, turkey, waterfowl, squirrels, raccoons, opossums, foxes, bobcats, ja cranes, cranes, coyotes and chipmunks (Stevenscranes, coyotes and chipmunks (Stevens 1996). cranes, coyotes a atat Havasu NWR, this list of species was provided to emphasize the diverse diet of feral hogs and the number of species affected by their presence.

LittleLittle is known about the introduction ofLittle is known about the introduction of feral hogs on Havasu NWI fromfrom domestic stock that belonged from domestic stock that belonged to the Soto Rfrom domestic stock floodingflooding of the Colorado River is assumed to beflooding of the Colorado River is assumed to be the prim swine. Reports of swine. Reports of feral swine on the marsh lands go back furth

estimated stimated feral hog population on Havasu NWR is between 300 - 400 individuals. There are frequentfrequent sightings of feral hogs byfrequent sightings of feral hogs by Refuge staff and frequent sightings of fallfall months, sows are often observed with as many as 13 fall months, sows are reportreport frequent sightings of feral hogs feeding and wallowing along the marsh edges report frequent sighting summer months.

The The first organized attempt to control feral hogs on the Refuge was a public hunt in March of 1975. This This attempt resulted in a low hunter success rate and high This attempt resulted in a low hunter success rate and takentaken out of the 175 hunters recruited (USFWS 1979). taken out of the 175 hunters recruited (USFWS consisconsisted consisted of opportunistic shooting by Refuge personnel with high-powered rifles. This remained remained uremained unchanged until January of 2000 when the Biological literature literature search to literature search to solicit information regarding literature search to sol

1.2 Purpose

CurrentCurrent management practices on the RefugeCurrent management practices on the Refuge are directed at toto assure the preservation of native plants and animals, especially those threatened with extinction.

The The majority of the feral hog population is The majority of the feral hog population is concentrated in the 15,92′ unitunit embraces all of the Refuge northunit embraces all of the Refuge north of Interstate 40, with boundary (Figure 1). The heart of this unit is an impounded 4boundary (Figure 1). The heart of waterwater bays, ponds, and channels water bays, ponds, and channels laced water bays, ponds, and channels withinwithin the marsh offer valuable habitawithin the marsh offer valuable habitat for a widwithin the endangered endangered species. Itendangered species. It was formerly believed that the feral hog population was retroportopock Topock Marsh Unit due to human habitation and development. However occasional sightings of feralferal hogs began in 1994 at the Topock Gorge Unit of the Refuge feral hogs began in 1994 at the Topock Gorge inin this area are commonplace. It is speculated that the populi UnitUnit has expanded down the river corridor from the Topock Marsh species pecies that have been hindering species that have been hindering Refuge management practices pecies that concernconcern is the constant threat they pose to the fragile desert ecosystem as well as the concern is the constant endangered wildlife found on the Refuge.

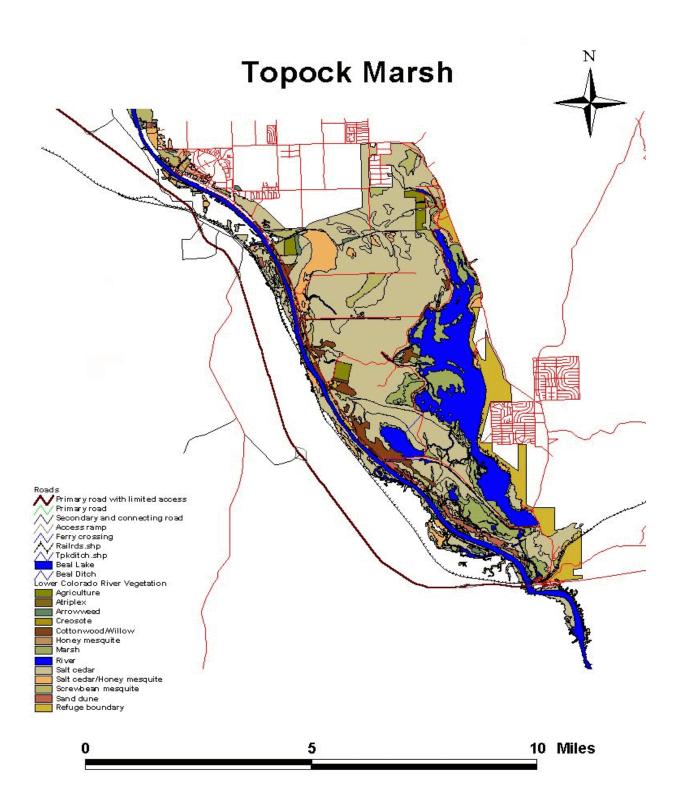


Figure 1. Arc view image of Topock Marsh.

InIn addition, feral hIn addition, feral hogs have In addition, feral hogs have been inflicting damage to waterfow ditches, ditches, and levees. Our goal to completely eradicate this exotic pest is necessaditches, and levees management practices are to be successful.

1.3 Need

RootRooting, Rooting, trampling, consumption, accelerated erosion and predation are among the documented impactsimpacts of feral hogs in the US (Sterner and Barrett 1991). Rooting, if simpacts of feral hogs in the potentially alter plant community succepotentially alter plant community succ

ConcernConcern about the susceptibility of wetlands to feral hog damage is great, due to the nature oConcern at sensitivesensitive habitat. During the warm summer months, hogsensitive habitat. During the warm summer shallowshallow wetlands resulting in erosion that might impact watershallow wetlands resulting in erosion that might impact watershallow wetlands resulting in erosion that might endangered resulting in erosion that might impact watershallow wetlands resulting in erosion that might endangered resulting in erosion that might impact watershallow wetlands resulting in erosion that might endangered resulting in e

FeralFeral hogs are notorious for inflicting crop damage and Feral hogs are notorious for inflicting crop damage an RefugeRefuge croplands (USFWSRefuge croplands (USFWS 1975). At Havasu NWR, damage to Refuge cropla irrigationirrigation ditches, and levees has been a problem for a rofof hog-proof fence was constructed for hog-proof fence was constructed around the 100 acre Topock Farm field 4 miles of 4 miles of fence was constructed along the Pintail slough waterfowl food production area4 miles of fence (USFWS(USFWS 1979). By 1986 the fences had become dilapidated and hogs were, once again, By 1986 the fences en in these areas.

FeralFeral hogs serve as Feral hogs serve as disease reservoirs (USFWSFeral hogs serve as disease reservoirs (USF and other animals from the 13 diseases they arand other animals from the brucellosis, brucellosis, pseudo rabies, tuberculosis, bubonic plag twotwo diseases of most concerntwo diseases of most concern are pseudo rabies and swine brucellosis. Pseudotwo toto the rabies virute the rabies virus and cannot to the rabies virus and cannot infect humans (Stevens 1996) nervousnervous system. It cannervous system. It can be transmitted and carried by both domestic and feral hogs toto cattle, horses, goats, sheep, dogs, cats, raccoons, skunks, opossums, to cattle, horses, goats, sheep, dogs, cats, OnceOnce hogs become infected, they are carriers for life. transmittedtransmitted through reproductive discharges such as semen or afterbirth (Stevens 1996). Totransmitted

thethe only method of control involves testingthe only method of control involves testing and removing infected ind inin wild populations. This in wild populations. This disease could be transmitted to humans, and in wild population symptoms, arthritis, and meningitis (USDA). symptoms, arthritis, and meningitis (USDA). symptoms, arthritis, and nono cure for other animals. Both diseases would dramatically impact profits of the local swine industry industry. Producers would be unable to sell breeding of testing and eliminating either disease would be astronomical.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 No Action

Under Under this Under this alternative, there would be no Under this alternative, there would be no change in the convolution with incidental shooting of feral hogs whenwould continue with incidental shooting of feral methodmethod has proven to be ineffective and would result in unacceptabmethod has proven to be ineffective resources on the Refuge and adjacent private property. resources on the Refuge and adjacent private property management programs formanagement programs for endangered species, waterfowl food production areas, and programs.

2.2 Physical or Mechanical Barriers

UnderUnder this alternative, hog wire, which has graduated mesh size fUnder this alternative, hog wire, we largerlarger on the top, would be erected to keep feral hogs from occupying each management larger on feral hogs in the enclosed feral hogs in the enclosed management units will be eliminated viaferal hogs in the enclosed intensive intensive intensive staff trintensive staff trapping and hunting effort. This control method is generally mostmost expensive and lmost expensive and least effective control method for permanent control because feral hogs can find the permanent (Stevens 1996).

2.3 Public Hunting

OnlyOnly one public hunt for feral hogs has been conducted hunt for feral hunt for fera

2.4 Contract Removal Experts

UnderUnder this alternative, the refuge would contract feralUnder this alternative, the refuge would contract feral Properties and expertise level in feral hogamounts and expertise level in feral

refugerefuge property to trap feral hogs. The Refuge reserves the right to conduct background investigations on any potential trapper (USFWS 2000). All feral hogs captured undinvestigations becomebecome the property of the permittee upon leaving the Refuge. It will be required that albecome the parallel caught are dead prior to leaving refuge property. Trappers will caught are dead allall actions of all actions of the permittee will be closely monitored by refuge staff. In addition, allall actions of the bebe be required to submit monthly progress reports that include information on numbers and descriptions of of feral hogs. This method is utilized with success in both Merritt Island NWR of feral hogs. Grande Valley NWR Complex (with the exception of a few minor differences).

2.5 Interagency Agreement with Wildlife Services- Proposed Action

UnderUnder this choseUnder this chosen aUnder this chosen alternative, the refuge will develop an Interag servicesservices withservices with the Wildlife Services (WS) divisionservices with the Wildlife Services (WS) toto aid in feral hog control. This method to aid in feral hog control. This method would entail contracting a profet throughthrough WS that would practice feral hog control on Refuge property year-round. This contracted individual would utilize an integrated pest management approach to feral hog control individual would involve involve the use of hunting with dogs, trapping, sweepining InIn addition, the contracted agent will be required to submit monthly progress reports that include information oninformation on numbers and descriptions of feral hogs. The assignedinformation on numbers and restrictions stipulated in the FHMP, and byprocedures and restrictions stipulated in the shotshot oshot on sishot on site and left in the brush for scavengers, although means to utilize meat resulting control efforts would be investigated.

3.0 AFFECTED ENVIRONMENT

3.1 Physical Environment

3.1.1 General

HHavasuHavasu National Wildlife Refuge (NWR) encompasses 37, 515 acres adjacent to the ColoHavasu National TopockTopock Marsh, Topock Gorge, and the HaTopock Marsh, Topock Gorge, and the Havasu WildeTopoc RefugeRefuge (FigRefuge (Figure 2). The habitat varies from thick cattail/bullrush stands and vegetationvegetation found along the Colorado River and Topock Marsh, to steep cactvegetation found along mountainsmountains found along Topock Gorge and Havasu Wilderness (mountains found along Topock established by Executive Order in 1941 to protect and manage established when Parker Dam was closed.

The The following is eThe following is excerThe following is excerpted from the *Preliminary Hydrologic Investigati* (-Brad Guay Ph.D. Candidate 1998):

The The climate is semiarid to arid, with a 50 year (Needles airport) average annu The climate temperature temperature between 115-125 degrees Fahrenheit atemperature between

(LCRB),(LCRB), or more specifically, between upper lake Mead and(LCRB), or more specifically, between waterwater is estimated by twater is estimated by the USBR (1996) as follows: (1) river- 18,700, and (3) backwater- 10,200 ac. Of these backwaterriver- 18,700, and (3) backwater- 10,200 of of the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl, Topockof the best habitat and foraging areas for waterfowl.

The The marsh receives The marsh receives Colorado River water through two east-flowing diversion canals not not lost to evaporation or snot lost to evaporation or seepage is released to wherewhere it eventually reenters where it eventually reenters the river. Within the marshwhere it eventually emergentemergent vegetation (sparse and dense areas areas.

The The target area for this Feral Hog Management Plan encompasses the 15,0The target area for this Feral Hog UnitUnit (Figure 1). This unit is bounded by Interstate 40 to the southUnit (Figure 1). This unit is bounded ReservationReservation to the North, and the Colorado River to the West. If Reservation to the North, and the successfulsuccessful around the marsh, they will be extended down the river corridor through the Tsuccessful Gorge unit.

3.1.2 Soils

The soils of Havasu NWR are The soils of Havasu NWR are located in the The soils of Havasu NWR are TheyThey are predominantly sandyin nature with the They are predominantly sandyin nature with the exception of T and and lake edges. Most of the soils have restricted drainage, and and lake edges. Most of the soil than than 60 inchesthan 60 inchest below the surface. In this than 60 inchest below the surface. In this area the war go down in October. The water table is at its highest from April to October.

3.1.3 Land status

The The following information is excerpted from the Lower Colorado River National Wildlife Refuges Comprehensive Management Plan (1994):

The The Service's jurisdictional rights on the The Service's jurisdictional rights on the lower Colorado Riv NWR,NWR, are proprietary. The majority of lands comprising NWR, are proprietary. The majority of lands were conveyed to the Service by Public Land Order after these lands had either been withwithdrawn withdrawn from Public Domain or had been obtained by the United States Government through through condemnation proceedings, through condemnation proceedings. The lower Colorado River encompassing Havasu NWR, were established encompass and and management of the lower Colorado management of the lower Colorado Riand management of private owners either voluntarily or by condemnation proceedings conveyance conveyance was through several Public Land Orders published conveyance was through several UnitUnited United States Fish and Wildlife Service (the Service) owns most of the land within the defined defined boundaries of Hadefined boundaries of Havasu NWR, as defined boundaries of Havasu Refuge Refuge on Bureau of Reclamation (BR)-acquired lands (for Refuge on Bureau of Reclamation (The The Refuge adjoThe Refuge adjoins acreage belonging to the Fort Mojave Indian Tribe, the Echemehuevi Indian Tribe.

InfrastructureInfrastructure on the Refuge includesInfrastructure on the Refuge includes several Refuge masseveral observation towers. One concession exists at Five Mileseveral toto the Topock Marsh Unit. Theto the Topock Marsh Unit. The concession operates underto the Topock isis privately operated and provides temporary trailer space privately operated and provides temporary docks, and grocery items. The lease terminates on July 31, 2006.

3.2 Biological Environment

3.2.1 Fauna

HavasuHavasu National Wildlife Refuge was established by *Executive Order 8647* on January 22, 1941,as a Refugeas a Refuge and breeding ground foras a Refuge and breeding ground for migrator birds,birds, 42 species of mammals and 38 species of reptiles and amphibiabirds, 42 species of mammals and Havasu NWR (USFWS 1994).

FederallyFederally listed endangered species associated with Havasu NWR include two birds, the Yuma clapperclapper rail and the Southwestern willow flycatcher, two Colclapper rail and the Southwestern w RazorbackRazorback sucker and thRazorback sucker and the Razorback sucker and the Razorback sucker and the Bol TheThe Refuge is also wiThe Refuge is also within the range of the lowland candidate species.

Havasu NWR also Havasu NWR also supports a variety of species that are State-Listed. Havasu NWR also supports a variety of species that are State-Listed. Havasu NWR also supports as threatened in California and as a species of special covireovireo is listed as endangered in California. Arizona lists the Snowy egretvireo is listed as endangered egretegret as a species of Special Concern. The Yellow-billed egret as a species of Special Concern. To California and threatened in Arizona (USFWS 1994).

3.2.2 Flora

HavasuHavasu NWR is located in the southern portion of the MojaveHavasu NWR is located in the southern portion plants. In the spring, depending on rainfall patterns, plants. In the spring, depending on rainfall patterns colorcolor in the form of wild flowers and other herbcolor in the form of wild flowers and other herbaccolor MarshMarsh provideMarsh provide relief from the creosote flats and smoke tree/palo verdeMarsh provide relief from withwith the area. Goodding s with the area. Goodding s willow and Fremon Screwbean Screwbean and Honey mesquite. Havasu NWR is dedicated to the removal of exotic, invScrewbean species, species, such as salt cedar (*Tamarix sp.*), and restoration of native vegetation, such as willow a), a cottonwood.

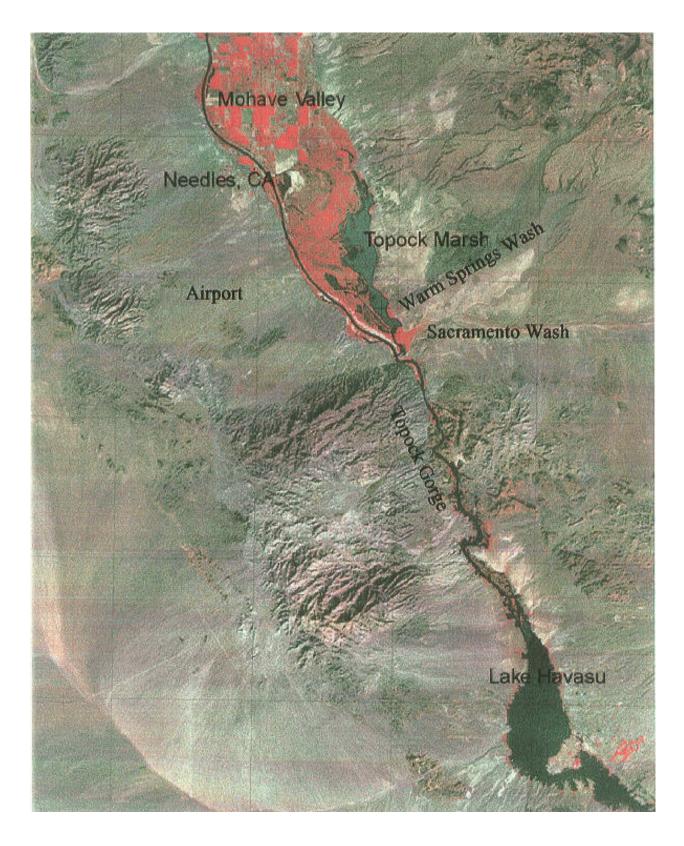


Figure 2. 1981 Landsat image of Needles Area.

3.3 Cultural and Human Environment

3.3.1 Archaeological/Historical Features

The The archaeological sites recorded to date on the The archaeological sites recorded to date on the Refuge typify the River. Rock art sites called petroglyphs, ground imagesRiver. Rock art sites called petroglyphs, ground imagesR

3.3.2 Public Use

Since Since it s establishment in 1941, Havasu NWR has been Since it s establishment in 1941, Havasu NE Each Each year Each year thousands of people launch their boats to explore the beauty found at the Each year thous unitunit of Havasu NWR. Topock Marsh is a favorite unit of quail hunting, kayaking, and canoeing.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 No Action

This This alternative would be detrimental to the This alternative would be detrimental to the Refuge s This alternative native native native wildlife resources. The feral hogs would continue to inflict damage to waternative wildlife resproduction areas, irrigation ditches and levees, revegetation sites, an programs programs. In addition, this alternative would programs. In addition, this alternative would result in conquality, quality, altered plant community successional sequences, asquality, altered plant community successional sequences are to remove feral hogs from Refuge lands.

4.2 Physical or Mechanical Barriers

AsAs previously stated, this control method is generally considered toAs previously stated, this control method is effective effective control method because feral hogs can find their way through just about any typeeffective control (Stevens 1996). In addition, hog proof fencing (Stevens 1996). In addition, hog proof fencing is difficult ().). Furthermore, because of the wides pread damage caused by feral hogs, the areas are too large effectively protect solely with physical or mechanical barriers (USFWS 2000).

Significant Significant negative impacts on the native ecosystem could resSignificant negative impacts on the alternative. Severe damage toalternative. Severe damage to vegetation would result from the clearing fencefence installation. The removal of vegetation would impact soil quality and increase erosion in some areas, areas, as well as accelerate the spread of undesirable, invasive vegetareas, as well as accelerate the s

equipment, increased traffic and noise equipment, increased traffic and noise levels, resulting from the likelylikely impact any wildlife species in the area. Furthermore, likely impact any wildlife species in the ar

4.3 Public Hunting

ImplementationImplementation of this almplementation of this altImplementation of this alternative may have a for hunters, increasing local economic activity, and decreasing the feral hog population.

NegativeNegative impactsNegative impacts that might be expected include: noise, safety concerns, vegetative disturbancedisturbance to research areas, an increased risk of fire, and high organizadisturbance to research are costs.costs. In addition, critical habitat may be negativelycosts. In addition, critical habitat may mark trails and by litter.

4.4 Contract Removal Experts

UnderUnder this alternative, feral hog control would be contracted out to the private sector under the specialspecial use permit. Contracted individuals would hapecial management units yearmanagement units year round. Large numbers of feral hogs could be expected shortshort period of time. Benefits to the localshort period of time. Benefits to the local economy from the purchase equipment would result.

ThiThisThis alternative would initially require intensive staff involvement due to the preparaThis alternative organizationalorganizational organizational effortorganizational efforts involved with handling background che permits, permits, and monitoring progress. Successful implementation of this alternative would also require closeclose monitoring by Refuge Law Enforcement Personnel. Contractorsclose monitoring by Refuge Law Enforcement personnel. Contractorsclose monitoring by Refuge Law Enforcement Personnel.

4.5 Interagency Agreement with Wildlife Services

AsAs previously stated, As previously stated, this As previously stated, this method would entail contracting a profes WSWS that would practice feralWS that would practice feral hog control of wouldwould utilize an integrated pest management approach towould utilize an integrated pest management approach towould utilize an integrated pest management approach towould utilize an integrated pest management with dogs, trapping, sweeping the area withuse of hunting with dogs, trapping, sweeping the area agentagent will have agent will have to abide by all procedures and restrictions stipulated in the FHMP, and agent will Refuge Refuge staff. All hogs would be shot on site and Refuge staff. All hog to utilize meat resulting from control efforts would be investigated.

This This alternative would require minimal Refuge supervision This altern

knowledge knowledge and ability to apply a knowledge and ability to apply a seriesknowledge and ability to apply a sinin a shorter period of time. This alternative is a shorter period of time. This alternative is believed to be their a control, control, in terms of the largest number of feral hogs to be taken in the shcontrol, in terms of the large Possible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the purchase of mPossible benefits to the local economy include the mpossibl

OneOne controversy that might be generated by tOne controversy that might be generated by this method O periodic aerial hunts. The noise of the helicopt wildlifewildlife populations and cause concern from the wildlife populations and cause concern from the surround inin temporary closure of the hunt area, and might cause in temporary closure of the hunt area, and might cause some leftleft out in the brushleft out in the brush will provide a food source for scavengers and nutrients from SomeSome conflict might arise from localSome conflict might arise from local hunters who might not agree with the because because of their inability to take part in the process, because of the havehave a long standing history with thehave a long standing history with the public. The publave a long standing history will be a vailable for public review. In Environmental Assessment will be staffstaff of Public Relations Specialists available that will assist in or as the need arises.

The The use of foot and neck snares might result in the capture of non-target species. The use of foot and neck caughtcaught in footcaught in foot snares could easily be released with the use of a snare-pole or by possibly adjuttee the tension of the trigger mechanism. Non-target wildlife caught the tension of the trigger mechanism. Non-unharmedunharmed by applying a Live-narmed by applying a Live-stop unharmed by applying a Live-stop from closing down all the way, thereform closing down all the way, thereform closing down all the vextremeextreme caution and careful placement in the applicaextreme caution and careful placement in the importance to ensure safety to all species of non-target wildlife.

When When using dogs, the agent will need tWhen using dogs, the agent will need to be aWhen using dogs, contracted agent hunts in the evening with dogs, there would be increased potential contracted agent hunt rarattlesnakes rattlesnakes (Crotalus sp.). Disturbance to vegetation might result from the construcrattlesnak placement of feral hog traps, although the placement of feral hog traps, although the contracted agent wou to the natural environment as a result of their professionalism and experience.

This This alternative is This alternative is relatively expensive and might require a significant increase in the Refuge InIn terms of the largest number of feral hogs to be taken in the shortest amount of time, this In terms of the isis believed to be the most believed to be the most effective. It is expected to have believed to be the most effective ecosystems cosystems on the Refuge by reducing the feral hog population to it is lowest possible although Although complete restoration of the riparian ecosystem to it is historical configuration is not possible due to the altered hydrology of the Colorado River, the removal of possible due to the altered hydrology of the Refuge in the Refuge is restoration and management efforts.

4.6 *Alternatives Table*

ALTERNATIVES TABLE

IMPACT TOPICS	NO ACTION	PHYSICAL OR MECHANICAL BARRIERS	PUBLIC HUNTING	CONTRACT REMOVAL EXPERTS	INTERAGENCY AGREEMENT
Habitat Improvement	Zero habitat improvement would result from this method.	Habitat improvement would increase as hog numbers decline. Dependant on how well fences are maintained.	Habitat improvement would increase as hog numbers decline. Number of hogs removed depends on success and length of hunt.	Habitat improvement would increase as hog numbers decline.	Most effective control method in tems of the largest number of feral hogs to be taken in the shortest amount of time.
Risks to Environment	Continued damage to endangered species recovery programs, revegetation sites, irrigation ditches and levees. Continued soil erosion and degradation of water quality.	Severe damage to vegetation. Possible restrictions to wildlife movement resulting in fragmented populations of wildlife. Trampling of habitat from fence installation.	Impacts from vegetative trampling, and trail construction, disturbance to research areas, an increased risk of fire.	Contractors might display less sensitivity to the impacts of their operation on the vegetation and wildlife.	Disturbance to vegetation might result from the construction and placement of feral hog traps. Noise from aerial hunts would temporarily impact wildlife populations. Non-target species would be at risk of entanglement in snares.
Cultural Resources	Zero impacts to public access and recreational opportunities.	Zero impacts to public access, recreational opportunities, and archaeological sites.	Increased recreational activities for hunting. Restricted public access for non-hunting visitors during hunt season.	Possible reduction of some public use. Benefits to local hunting enthusiasts who qualify for special permit.	Conflicts with local hunting enthusiasts. Zero public use during aerial hunts.
Social or Economic Issues	No change to social or economic issues.	Benefit to local economy from generating business for local suppliers of materials and contracting services for fence construction.	Benefits to local commerce from sporting goods purchases. Increased sense of community cohesion from public involvement.	Benefits to the local economy from the purchase of materials, ammunition and equipment would result.	Benefits to the local economy from the purchase of materials, ammunition and equipment would result.
Management Control	Limited- Refuge effort minimal. Full staff effort not required.	Intensive control from Refuge for feral hog management.	Limited management Refuge has indirect control of resource.	Indirect control by refuge personnel of feral hog management. Intensive hog reduction expected.	Refuge personnel in indirect control of feral hog management approach. Intensive hog reduction expected.
Expense	Method accomplished at current funding level.	Considered to be the most expensive and least effective control method for feral hogs.	Staff costs low. Cost of administration. Public access, supervision and maintenance high.	Substantial revenue for Refuge. Cost of staff supervision, organization and administration high.	Relatively expensive - might require a significant increase in the Refuge budget. Minimal Refuge supervision.

5.0 POLICIES AND REGULATIONS GOVERNING FERAL SWINE CONTROL

The following is excerpted from the Lower Rio Grande NWR Complex EA and applies directly to the contents of this draft EA:

The policy of the U.S. Fish and Wildlife Service (Service) is to engage in the control of wildlife within the National Wildlife Refuge System to assure balanced wildlife and fish populations consistent with the optimum management of Refuge habitat. All control methods will be accomplished by the most humane manner and in accordance with Service directives.

Incidental control and selective trapping of feral animals are authorized under the Refuge Manual, 7 RM 14.7E. In addition, animals without ownership that have reverted to the wild from a domestic state (i.e. feral hogs) may be taken by authorized Federal or State law or regulations as outlined by title 50 CFR (Code of Federal Regulations), Part 30, Section 11. Authorization of control practices are further governed by title 50 CFR, Part 31, Section 14: (a) Animal species which are surplus or detrimental to the management program(s) of a wildlife Refuge area may be taken in accordance with Federal and State laws and regulations by Federal or State personnel or by permit issued to private individuals; (b) Animal species which are damaging or destroying Federal property within a wildlife Refuge area may be taken or destroyed by Federal personnel. Disposition of feral hogs is covered under title 50 CFR, Part 30, Section 12: Feral animals taken on wildlife refuges may be disposed of by sale on the open market, gift or loan to public or private institutions for specific purposes, and as otherwise provided in section 401 of the act to June 15, 1935 (49 Stat. 383, 16 U.S.C. 715s). The authority to allow harvest of feral hogs on Refuge lands is governed under the provisions of the regulations for hunting on wildlife refuges title 50 CFR, Part 32.

6.0 CONSULTATION AND COORDINATION WITH OTHERS

Several contacts were made to solicit comments, views and ideas during the development of the Feral Hog Management Plan and Draft Environmental Assessment. Reginald Barrett, a leading authority of feral hogs from University of California Berkeley, provided much needed information and literature on feral hog biology and management. Hakalau Forest NWR in Hawaii, Merritt Island NWR in Titusville, Florida, Lower Rio Grande Valley Complex in Alamo, Texas provided management plans and Environmental Assessments for review from their respective stations to help address and draft feral hog control measures. Dave Jones of the Natural Resources Division, HQ 1ST INF DIV and Fort Riley provided information about development and the success he witnessed associated with the Interagency Agreement his agency developed with Wildlife Services. Kathy Granillo, Regional Office Biologist (R2) provided information on contacts and guidance. Jack Crabtree of San Bernard NWR, Brian Woodward of Ace Basin NWR, Dennis Sharp of Lake Ophelia NWR, Kelly Hayes of Aransas NWR, and Craig Heath of AZGF, all provided valuable information regarding feral hog control techniques.

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Appendix A. INTRA-SERVICE SECTION 7 BIOLOGICAL EVALUATION FORM CONSULTATION/CONFERENCE/CONCURRENCE

Originator: Julie C. Connolly, Wildlife Biological Technician

Date: August 23, 2001

I. Region: Region 2

II. Service Activity (Program): Havasu National Wildlife Refuge

PO Box 3009

Needles, CA 92363

III. Pertinent Species and Habitat:

A. Listed species and/or critical habitat within the action area:

Southwestern willow flycatcher (Empidonax trailii)

Bonytail chub (Gila elegans) (critical habitat)

Yuma clapper rail (Rallus longirostris yumanensis)

Razorback Sucker (Xyrauchen texanus)

B. Proposed species and/or proposed critical habitat within the action area:

None

C. Candidate Category 1 species within the action area:

None

D. Candidate Category 2 species within the action area:

None

IV. Geographic Area or Station Name and Action:

The The proposed action is to The proposed action is to conduct a long term The proposed action is to conduct and and possibly along the Colorado River through the Topock Gorge Unit of Havasu National Wildlife Wildlife Refuge. Wildlife Refuge. The plan would entail development of an Interagency Agreemed Wildlife Services (WS) division of the US Department Wildlife Services (WS) division of contracted agent contracted agent would conduct hog eradication practices for a period of three year Integrated Wildlife Damage Management (IWDM) approximately would involve the use of calculations, neck and leg snares, and aerial shooting in coordination bunts, neck and leg snares, and aerial are in coordination with.

V. Location (map attached):

A. County and State:

Mohave, AZ

B. Distance (miles) and direction to nearest town:

The The Fort Mohave The Fort Mohave Indian Reservation (FMIR) borders in areasareas with expected feral hog control activity. A Memorandum of Understanding (MOU)(MOU) will have to b(MOU) will have to be developed as he Bureau of Land Management (BLM) land.

VI. Description of proposed action:

See attached draft Environmental Assessment

VII. Explanation Explanation of effects of Explanation of effects of action on species and critical habitat C, and D.

NoNo permanent adverse effects to critical habitat or specialNo permanent adverse effects to critical habitat thethe proposed project vicinity athe proposed project vicinity are exthe proposed project vicinity are includes includes stipulations and restrictions for anyone conducting feral hog control mustincludes stipulated They are as follows:

- 1.1. No feral hog control in the Southwestern willow flycatcher (WIFL) habital. No feral hog control breeding season April 15-September 1.breeding season April 15-September
- 2. No trail or vegetation cutting in WIFL habitat.

The The main area of the project site does not provide The main area of the project site does not provide adea BaldBald eagles and none are present within the action area (Havasu NWR unpublished survey information). Information). The periodic aerial hunting of feral hogs, information). The periodic corridor in late fall/early wintercorridor in late fall/early winter (before Peregrine falcons arrive fro breeding season) will avoid any adverse impacts to nesting Peregrine falcons.

Although Although the area is witAlthough the area is within designatAlthough the area is within of bonytailsbonytails present in thebonytails present in the area. Bonytail chubs and Razorback suckers were destroted to be introduced into to be introduced into Beal Lake after completion of the improvement project. Due to a series of delays and project probeen been postponed indefinitely. Due to a series of delays and project probeen postponed indefinitely. If anything, a PlanPlan would benefit their critical habitat by reducing the numberPlan would benefit their critical habitat that area.

VIII. Effect determination and response requested: A. Listed species/critical habitat: Determination R e s p o n s Response Requested No effect *Concurrence Is not likely to adversely affect (Southwestern Concurrence willow flycatcher, peregrine falcon, bald eagle, Yuma clapper rail, razorback sucker, or critical habitat of bonytail chub) Is likely to adversely affect *Formal Consultation Undetermined effect Informal Consultation **B.** Proposed species/critical habitat: **Determination** Response Response Requested No effect *Concurrence Is not likely to adversely affect Concurrence Is likely to adversely affect *Formal Consultation Undetermined effect Informal Consultation C. Category 1 Candidate species: Determination Response Response Requested No effect *Concurrence Is not likely to adversely affect Concurrence Is likely to adversely affect *Formal

Undetermined effect

Consultation

Informal

D.	Remarks: The proposed action is notThe proposed action i the action will be minimal.	s not likely to The propos	sed action is not likely to adver	sely
IX.	Reviewing Office of evaluation:	.		
	A. Concur	Non	concurrence	
	B. Formal consultation required			
	C. Conference required			
	D. Remarks (additional pages attached as no	eeded):		
		Signature	Date	

^{*} Optional

Appendix B. NEED FOR MEMORANDUM OF UNDERSTANDING

FeralFeral hogs are not just isolated Feral hogs are not just isolated on RefuFeral hogs are not just isolated Refuge.Refuge. IfRefuge. If the goal of total eradication of feral hogs is to be met, Refuge. If the goal of total eradication of the lands are established in order to prevent plands that populations are established in order to mean mean are established in order to mean and the lands (Bureau of Memorandum of Understanding (MOU) with those bordering lands (Bureau of Memorandum of Understanding Indian Reservation) is necessary to ensure success of this project.